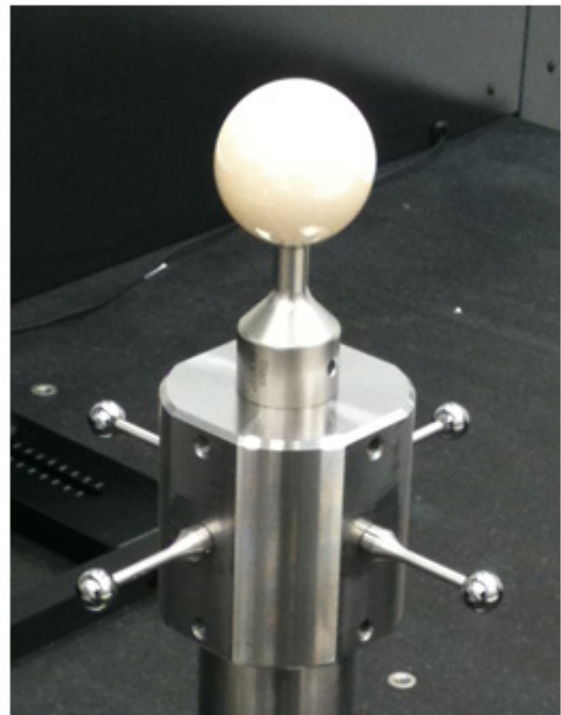
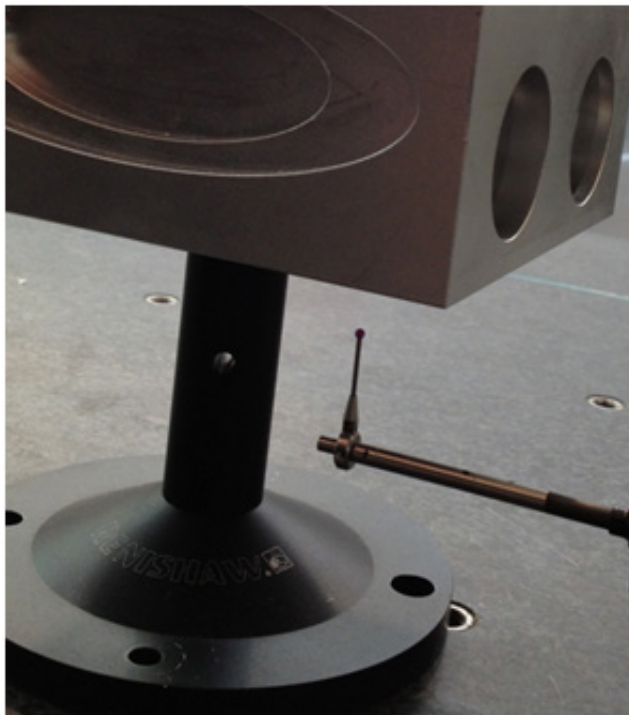


Cranked styli and multiple spheres



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Cranked styli and multiple spheres

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Contents

1	Cranked styli and multiple spheres.....	6
1.1	Tutorial pre-requisites.....	6
1.2	Tutorial objectives.....	6
2	Introduction.....	7
3	Create a crank stylus.....	8
4	Add the calibration spheres.....	10
5	Assign the calibration sphere	11
6	Locate each calibration sphere	13
7	Logical tool names	14
8	Calibrate the tools in UCCserver.....	16
9	Conclusion.....	17

1 Cranked styli and multiple spheres

1.1 Tutorial pre-requisites

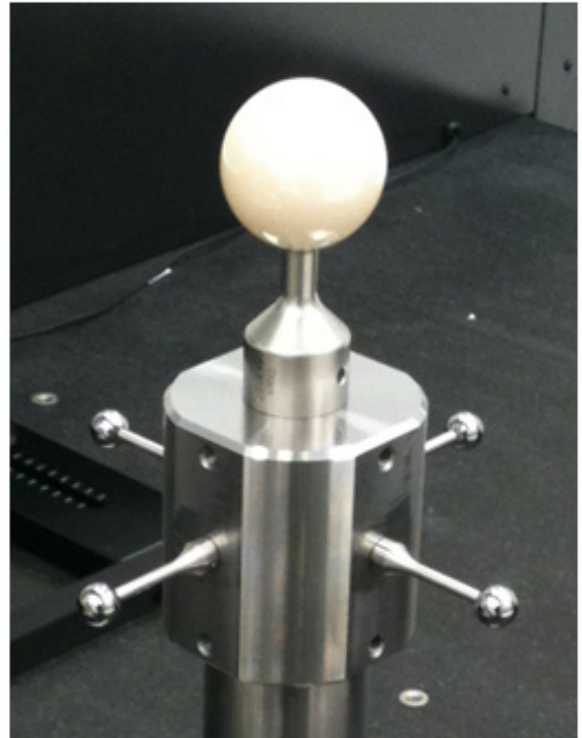
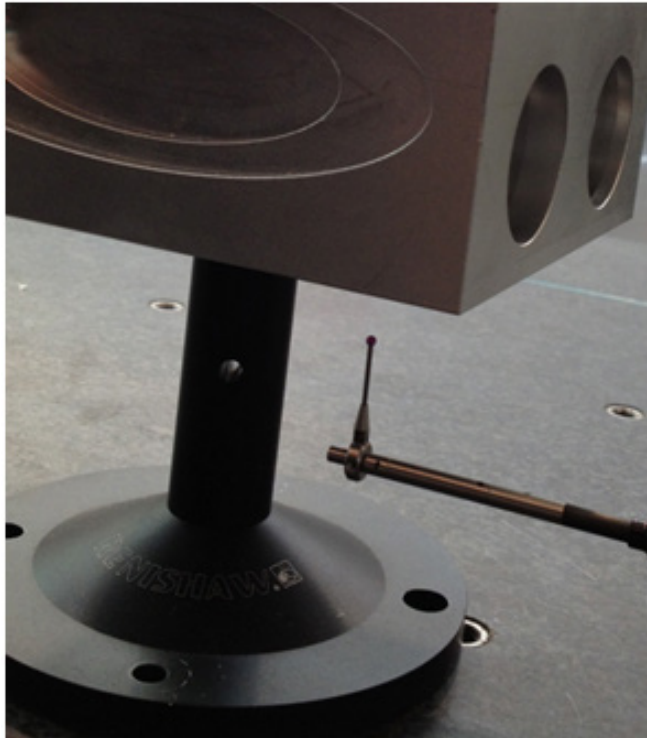
- The student should have completed all of the basic tutorials

1.2 Tutorial objectives

- Further exposure to Renishaw specific hardware and software interaction
- Exposure to the concept of part-specific tool systems and hardware definition
- Consideration of hardware / software interaction

2 Introduction

There are situations that require the use of crank and star arrangements. For example, when measuring a hole underneath the item being inspected, the only way to access the hole is with a crank stylus.

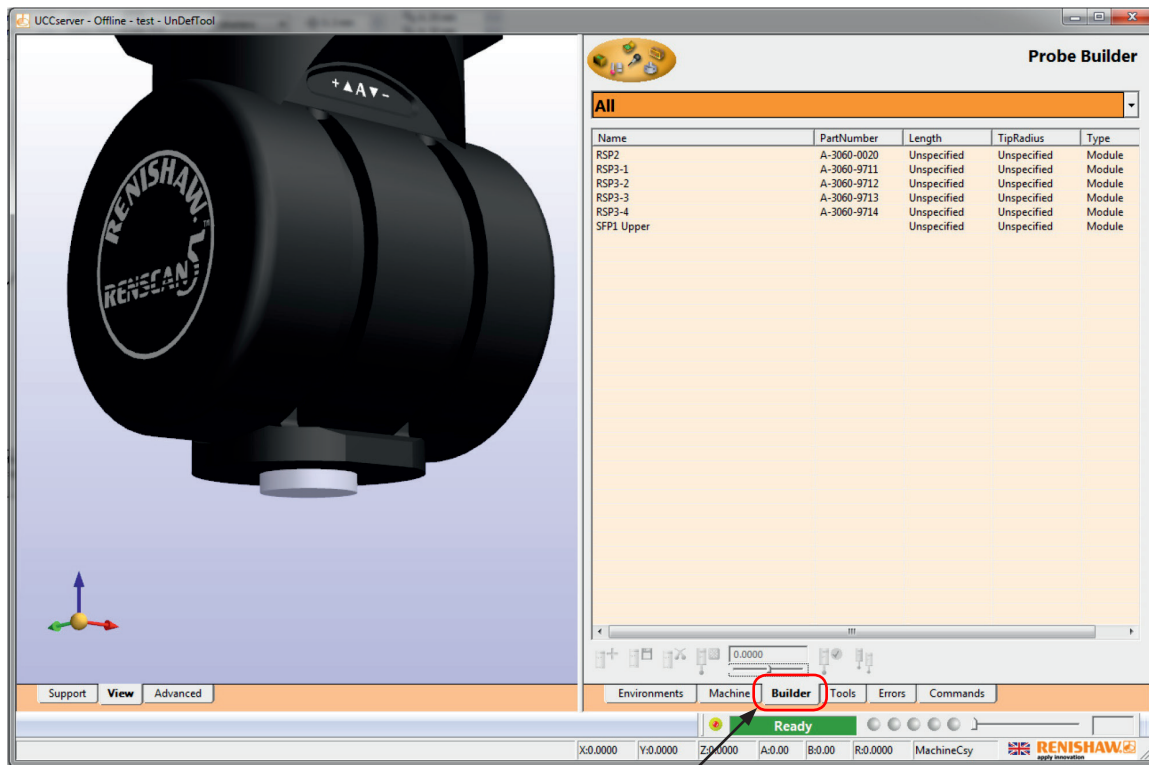


The difficulty of using a crank or star stylus that is pointing up (in plus Z) is that it cannot be calibrated with a calibration sphere that is also pointing up. This is why UCCserver has the capability to create more than one calibration sphere. In the case shown above, a calibration sphere must be used that is pointing horizontally rather than vertically.

3 Create a crank stylus

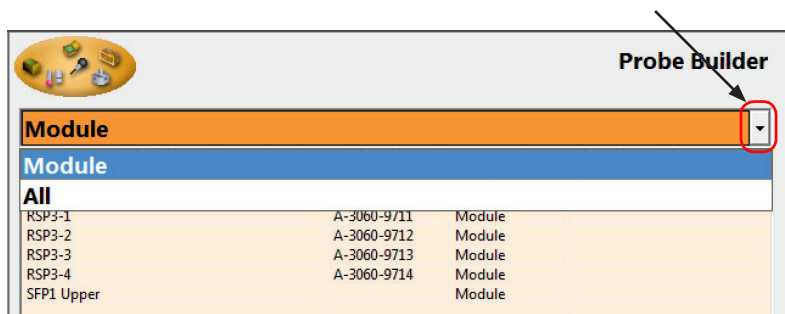
Set up an environment as detailed in previous tutorials and add a suitable module.

GUIDANCE NOTE: When using REVO only RSP3 modules can use crank or star arrangements.



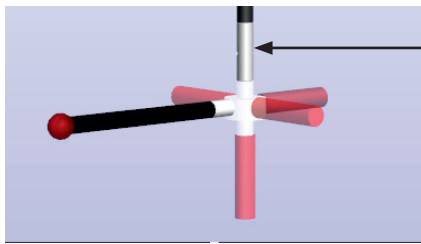
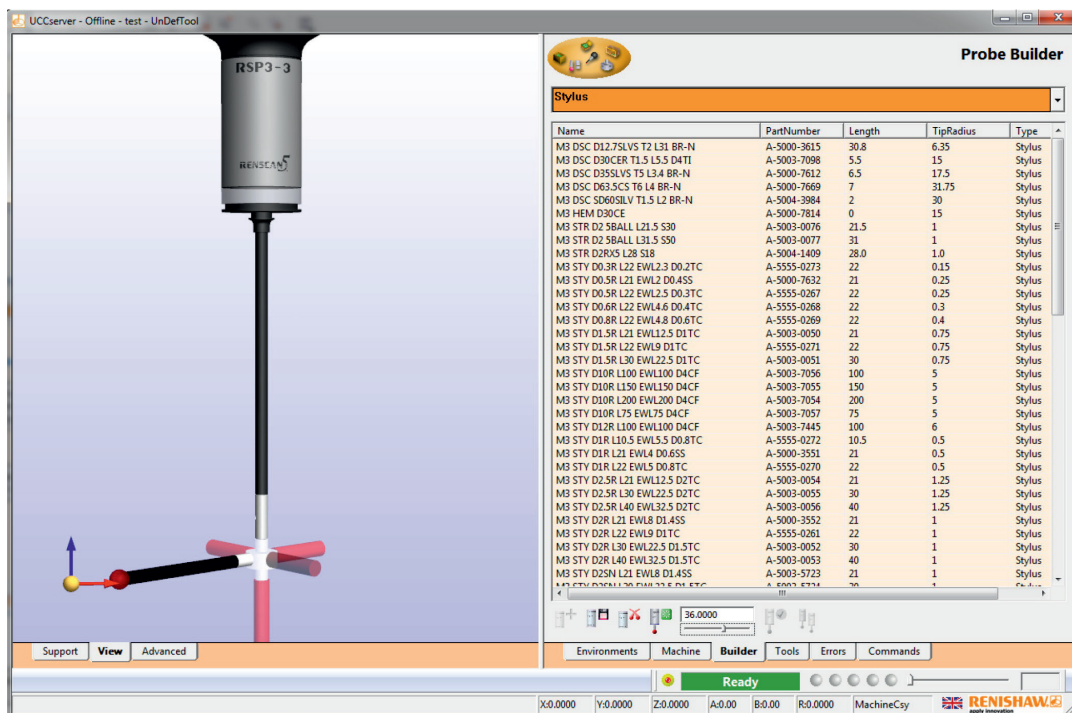
Click: 'Builder' tab.

For ease of use, when selecting tool components, the drop down menu can be used to refine what is shown in the selection box (i.e. module, holder, extension, or stylus). Alternatively, the default 'ALL' setting can be used to show a list of all possibilities.

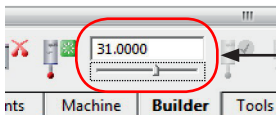


Add a 5-way adapter and a stylus to the minus Y side of the adapter.

GUIDANCE NOTE: Click on the red, minus Y cylinder of the 5-way adapter before adding the stylus.



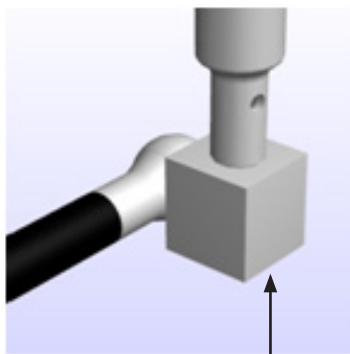
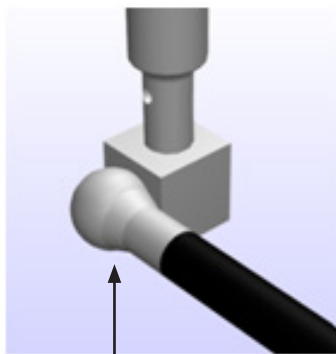
Left click and highlight the centre 5-way on the CAD model. This unlocks the rotational adjustment slider enabling the user to make any rotational adjustments.



This can be done by either using the slide rail or editing the value within the field.

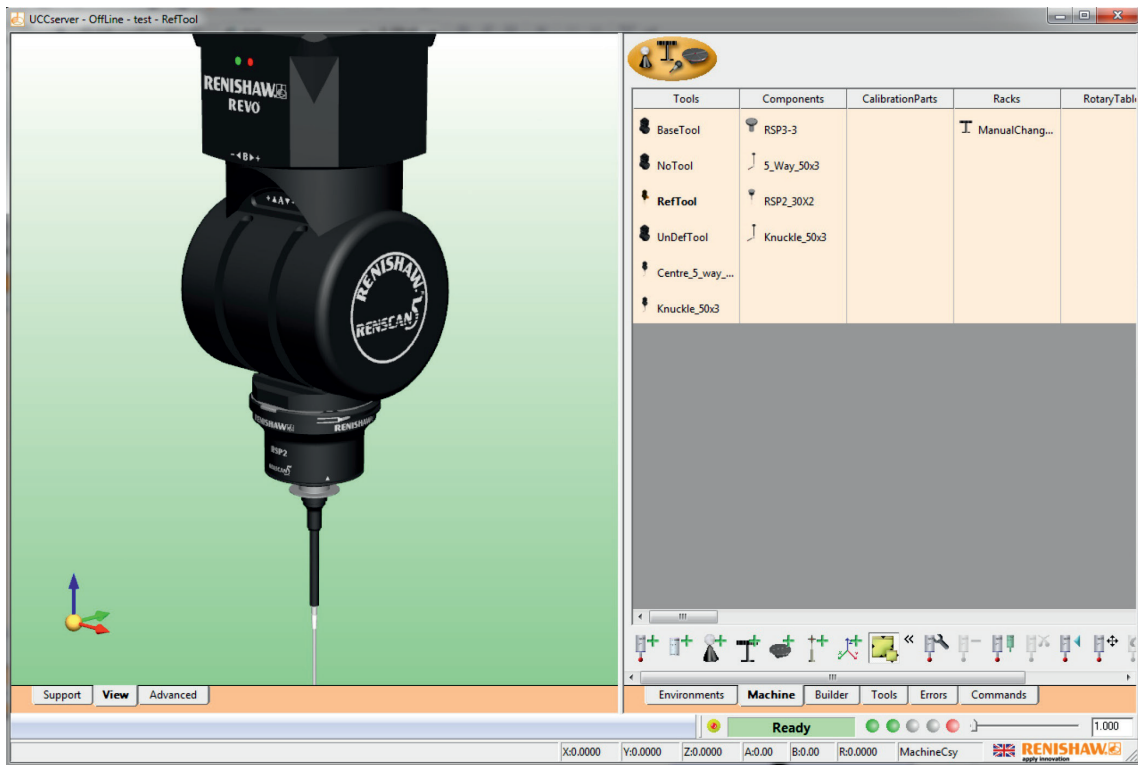
GUIDANCE NOTE: This principle also applies when using a stylus fitted with a knuckle joint. Knuckles are added using two pieces; an upper and lower portion.

If using a stylus fitted with a knuckle joint, left click and highlight the knuckle on the CAD model.

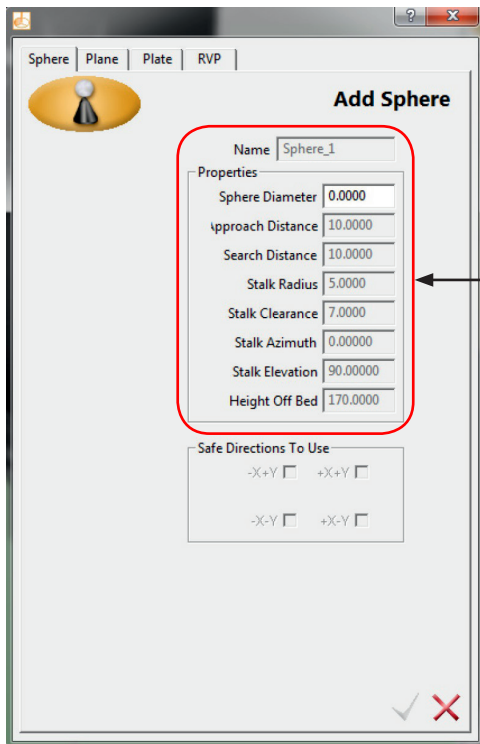


Each part of the knuckle can be adjusted, allowing the component to exactly match the actual component on the CMM.

4 Add the calibration spheres



Add calibration spheres that are suitably orientated to calibrate the tools previously created. One will be pointing in plus Z and the other will be horizontal.



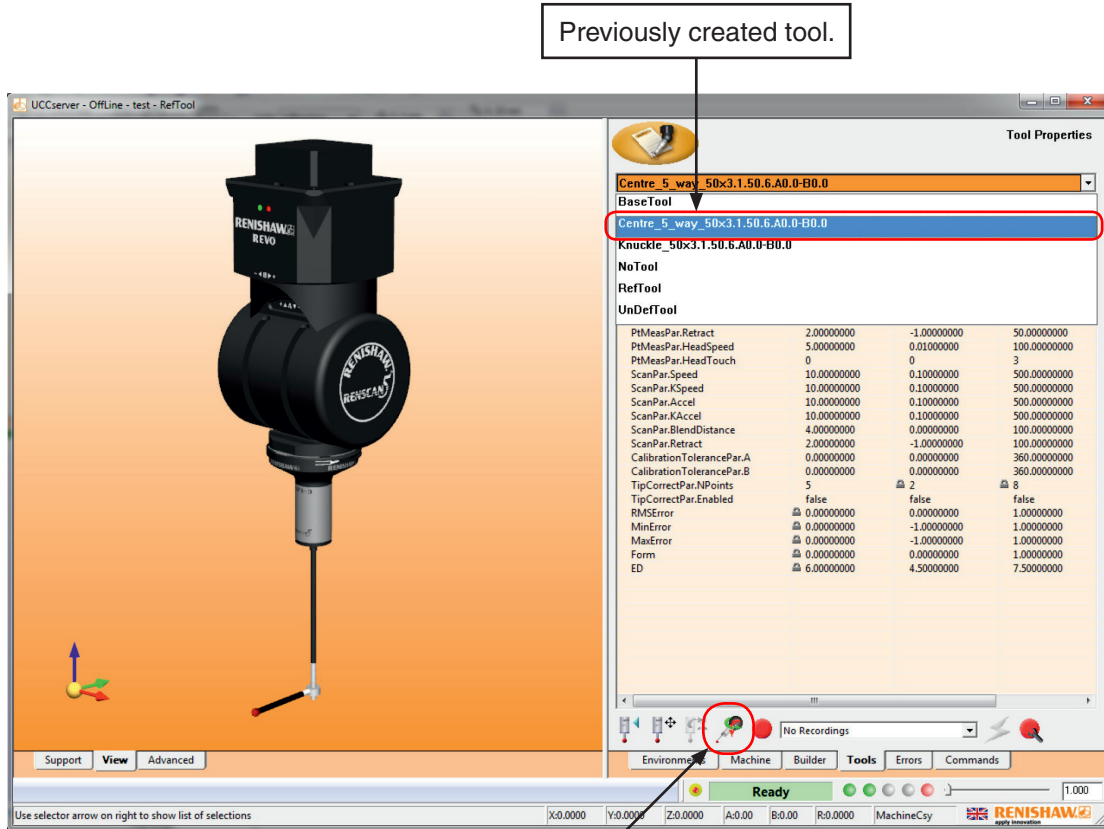
Enter sphere details into the relevant field boxes as described in previous tutorials.

The tools assembled in this tutorial require 'STALK AZIMUTH' and 'STALK ELEVATION' to be modified. Change them on the secondary sphere to allow the crank stylus to be calibrated.

GUIDANCE NOTE: For further information on 'STALK AZIMUTH' and 'STALK ELEVATION' see UCCserver Help (F1).

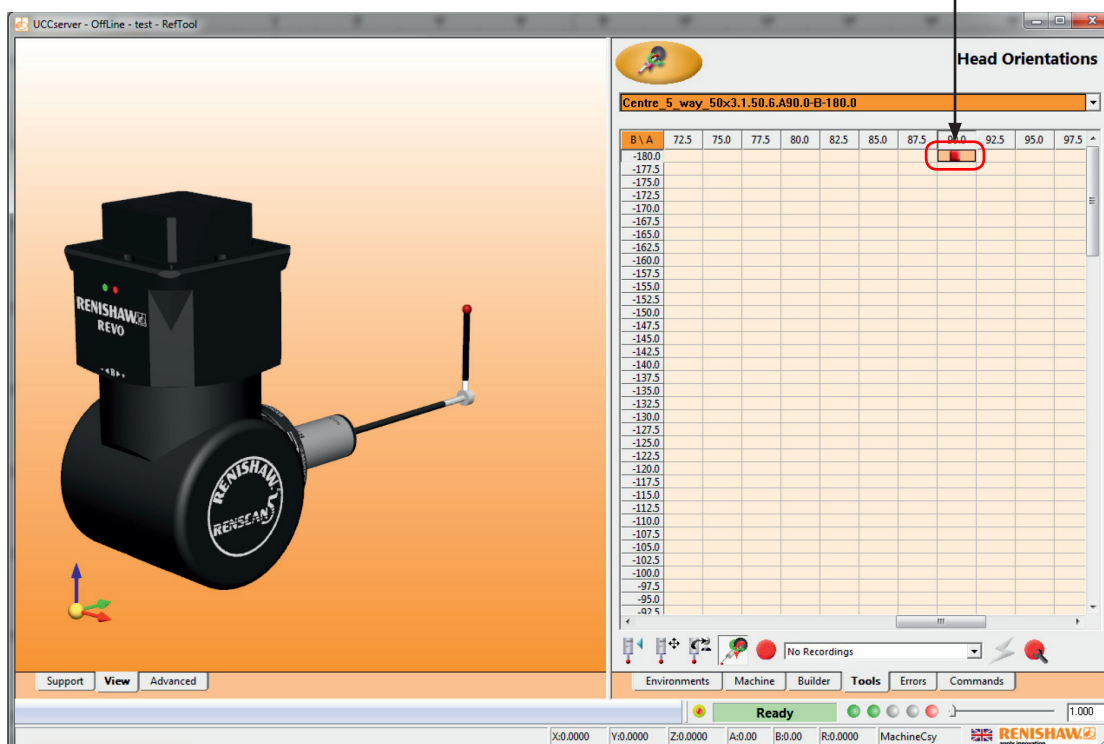
5 Assign the calibration sphere

To assign the calibration sphere to a previously created tool, click on the 'Tools' tab and then use the drop down menu to select the tool.

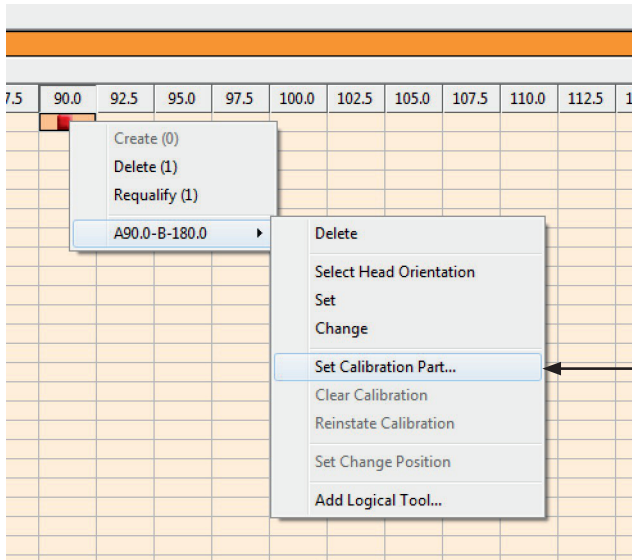


Click on the 'Head angle selector' icon.

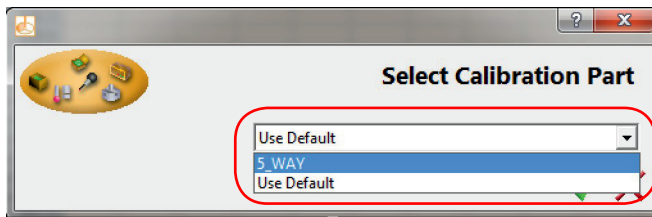
Select the required angle.



Right mouse click on the highlighted tool angle, place cursor on displayed head angles and then select 'Set Calibration Part'.

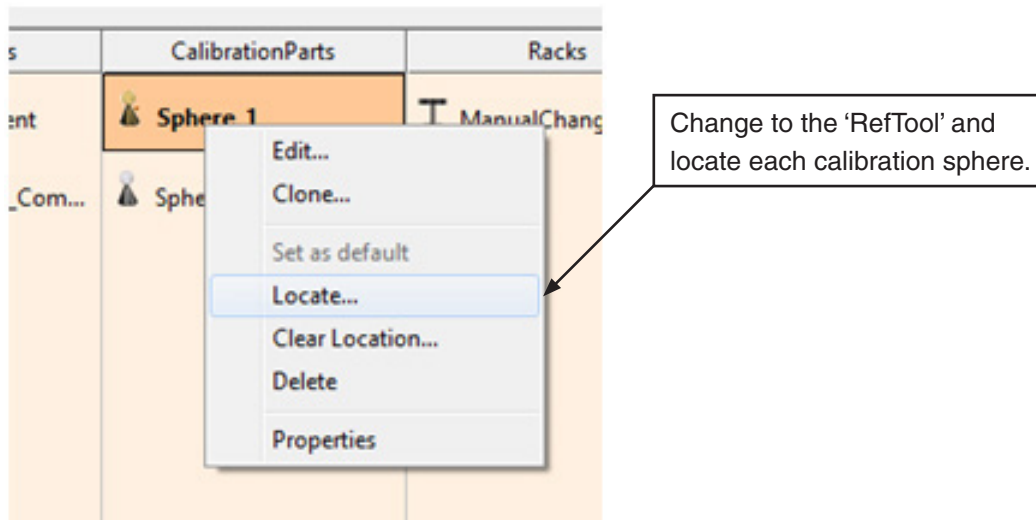


Select: 'Set Calibration Part' .



From the drop down menu select the most suitable calibration sphere.

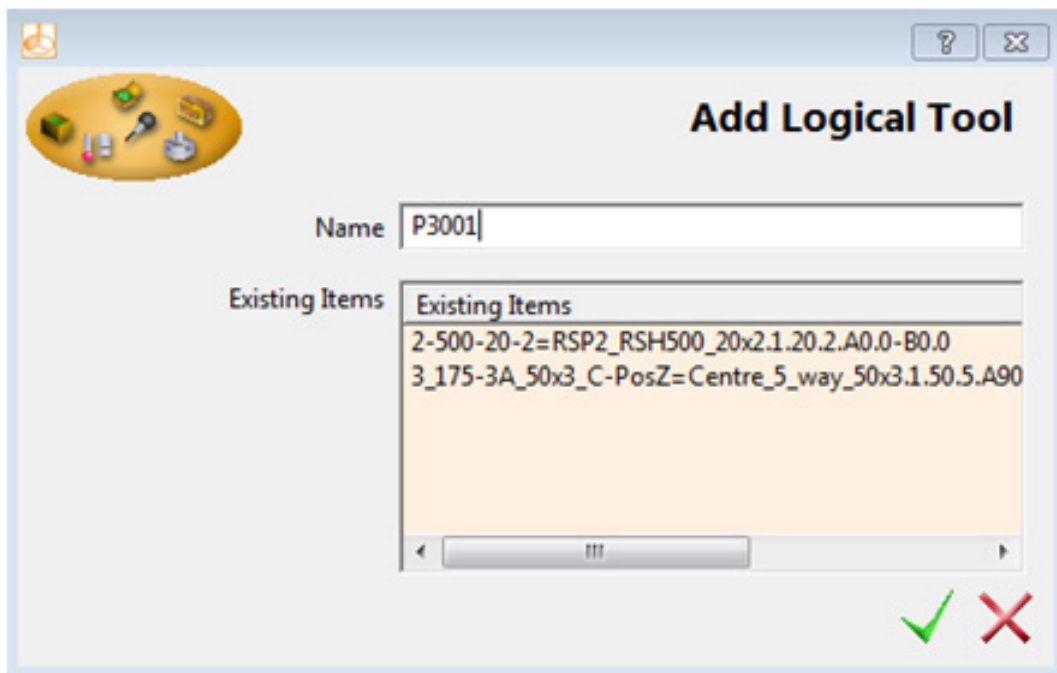
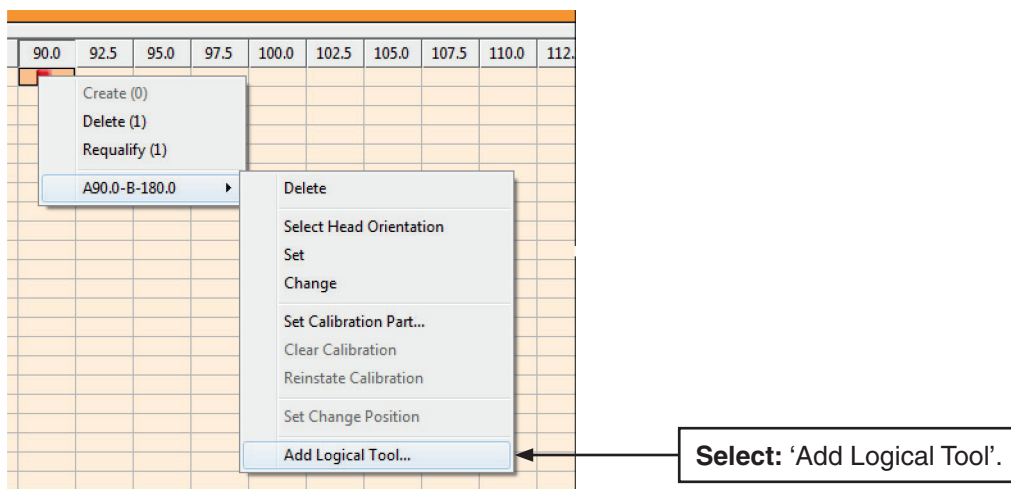
6 Locate each calibration sphere



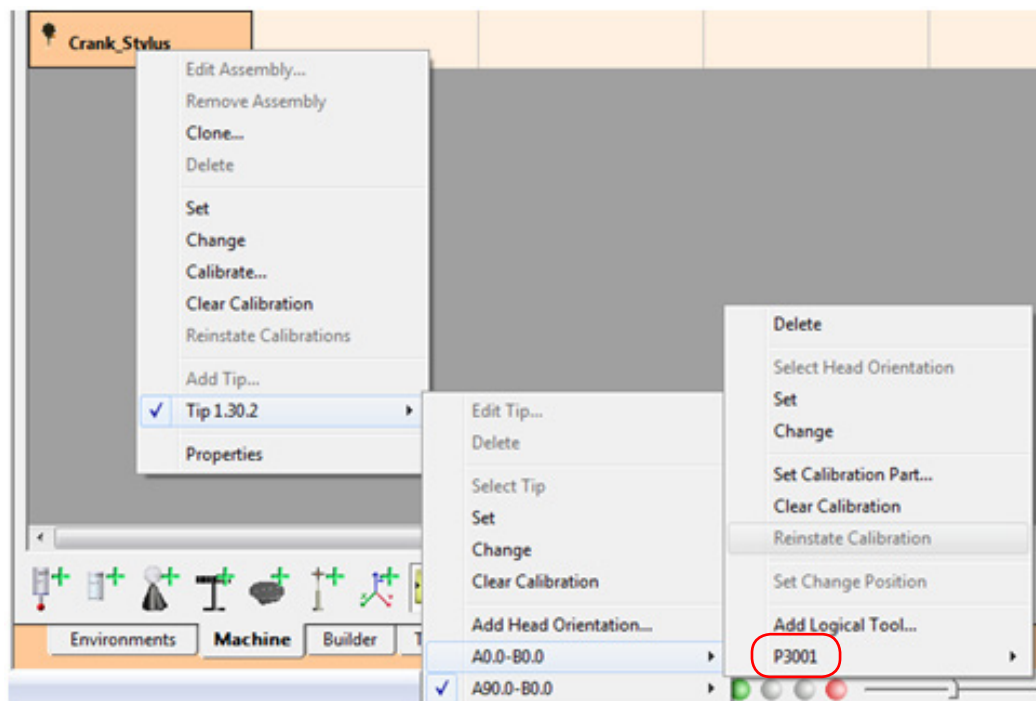
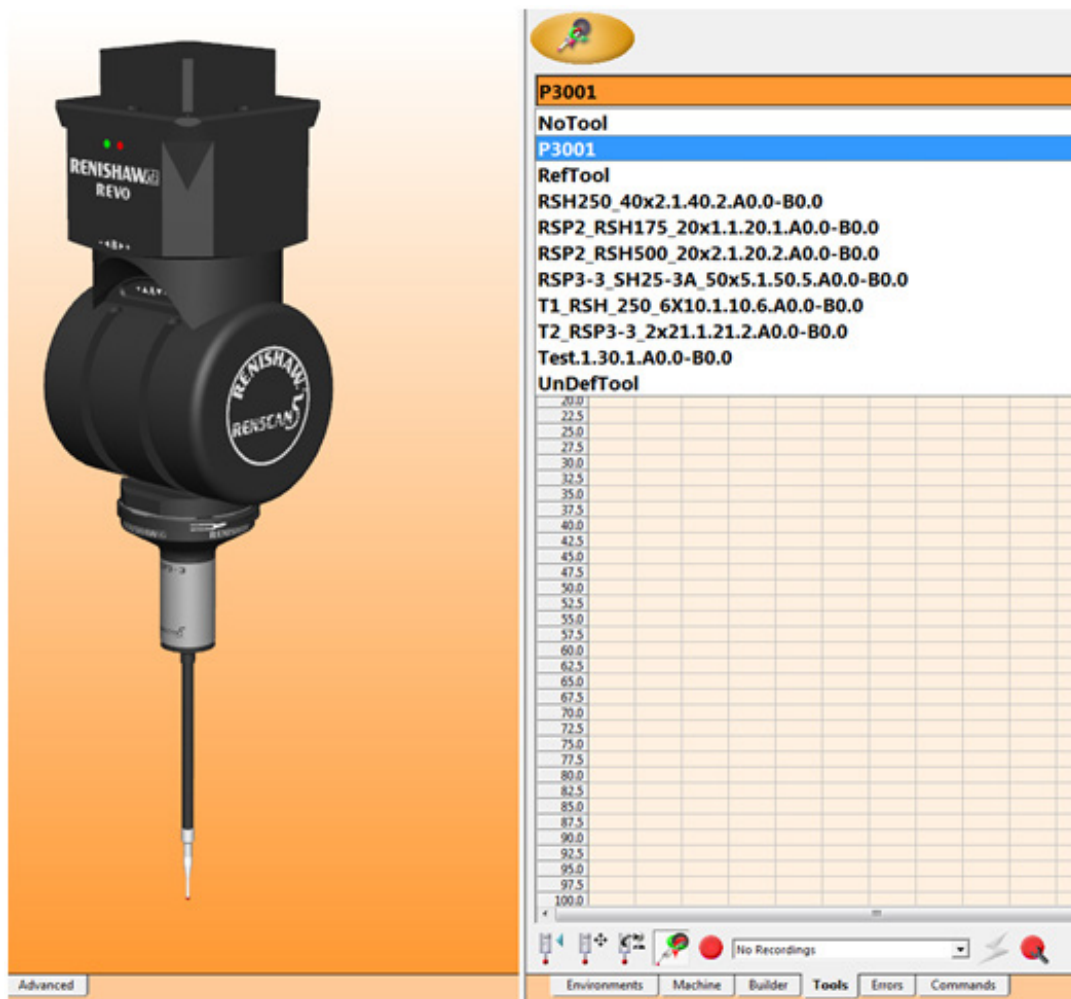
7 Logical tool names

If a large numbers of tools of the same type are going to be created on multiple machines then it is advisable to use 'Logical tool' names. Using 'Logical tool' names makes the management of large numbers of tools easier through the use of a defined method of name creation. The defined method could be a coded method (e.g. P3001), which could represent the probe - RSP3 Tool 1 (A=0, B=0).

To add a 'Logical tool' name to an already created tool, open the 'Head angle selector', then right mouse click on the desired tool angle. From the dropdown menu select the 'Head angle' (in this case A90.0, B-180.0) and select 'Add Logical Tool'.



Enter a meaningful name and it will appear in the list.

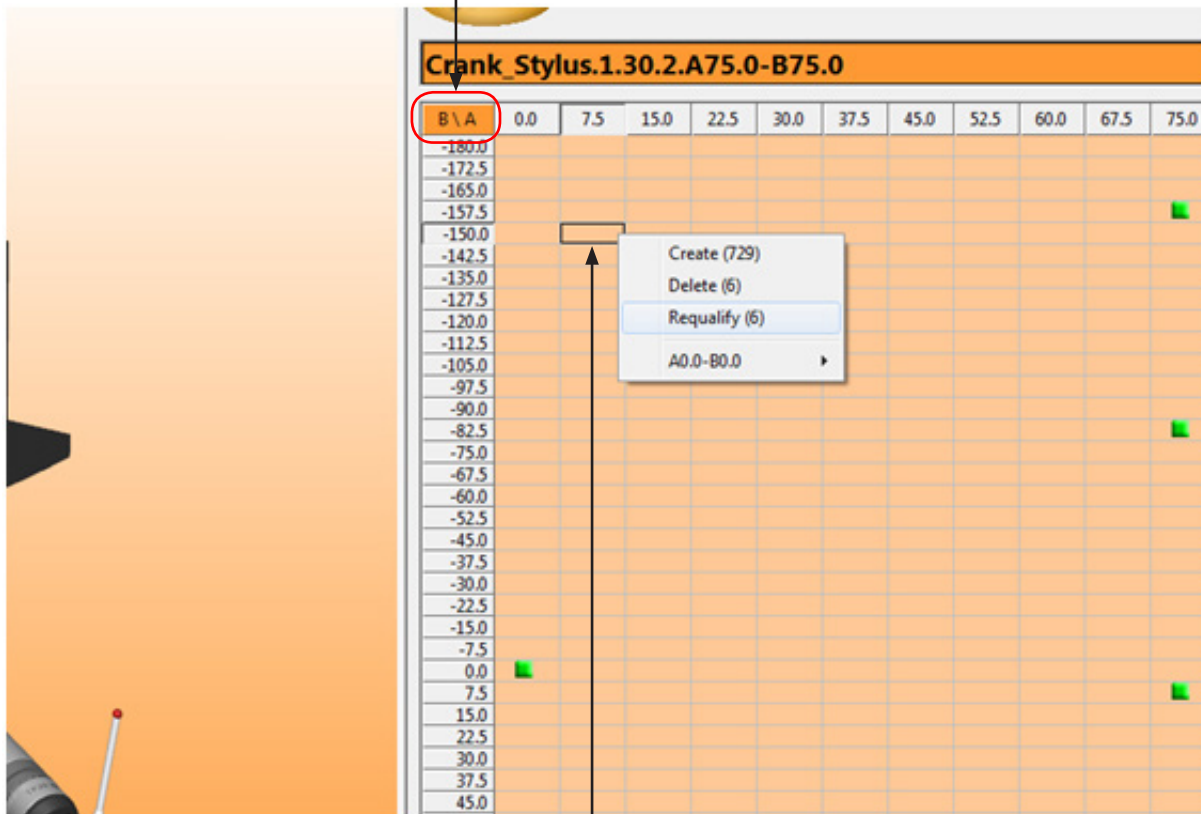


GUIDANCE NOTE: The 'Logical tool' will not appear directly in the 'Tools list' on the 'Machine' tab, but will show in the logical tool list of the probe to which it is assigned.

8 Calibrate the tools in UCCserver

With a specific calibration sphere assigned to each tool, when MODUS calls for a tool to be requalified, the assigned calibration sphere will be used.

Left click in the left corner of the head angle selector (i.e. 'B/A') and the grid will highlight in orange.



Right click anywhere in the grid and select 'Requalify(n)' and all angles will be requalified to the correct calibration sphere if they have been assigned correctly.

9 Conclusion

This tutorial has demonstrated how to create multiple calibration spheres that are necessary in order to calibrate certain probe configurations such as crank and star styli. Without the ability to assign a calibration part, the default calibration sphere would need to be changed each time a new calibration sphere is used, making it impossible to use the head angle selector in UCCserver to calibrate all tools that need an alternate calibration sphere.

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